Shadow Lab

Kit contains:

- Pipe cleaners
- Ruler

You will need: tape, paper, a pencil, several small weights, and a sunny day.

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INSTRUCTIONS

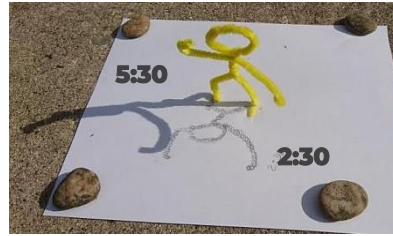
Step 1. Twist your pipe cleaners into the shape of a little character. Be sure to keep it short.

Step 2. Tape your character, standing upright, in the middle of your paper.

Step 3. Place your paper outside in the sun. Weigh down the corners with small objects such as rocks. You do not want your paper or character to move for the rest of this activity.

Step 4. Trace the shadow that your character casts on the paper. Record the time next to your sketch. Leave the paper alone.

Step 5. Over the course of the day, observe how the shadow moves. Trace the new shadows and record the times. (Add extra paper if needed.)



QUESTIONS

1. How did your pipe cleaner character's shadow move over the course of the day? (Clockwise? Counterclockwise?)
2. Why do you think the shape of the shadow changed throughout the day?
3. How tall is your pipe cleaner character?
4. Measure the shadow outlines. How did the shadow's size change throughout the day?
5. At which time of day did your character cast the longest shadow? The shortest?

LIGHT AND SHADOWS

Shadows are formed when a source of light is partially blocked by an object. For your Shadow Lab, the source of light is the sun. The length of daytime shadows depends on the angle of the sun in relation to Earth. Shadows are longest at sunrise and sunset. Remember, the sun doesn't *actually* rise and set each day. Earth rotates!

The sun is so far away that shadows cast at the same time are in **proportion** to each other.

Let's say that Max, who is sitting like a very good dog, is 1 foot tall and casts a shadow that is 2 feet long. At that exact time, George, who is also a very good dog, sits at 3 feet tall and casts a 6-foot shadow. Each shadow is twice the height of the dog. The shadows are **proportionate**.